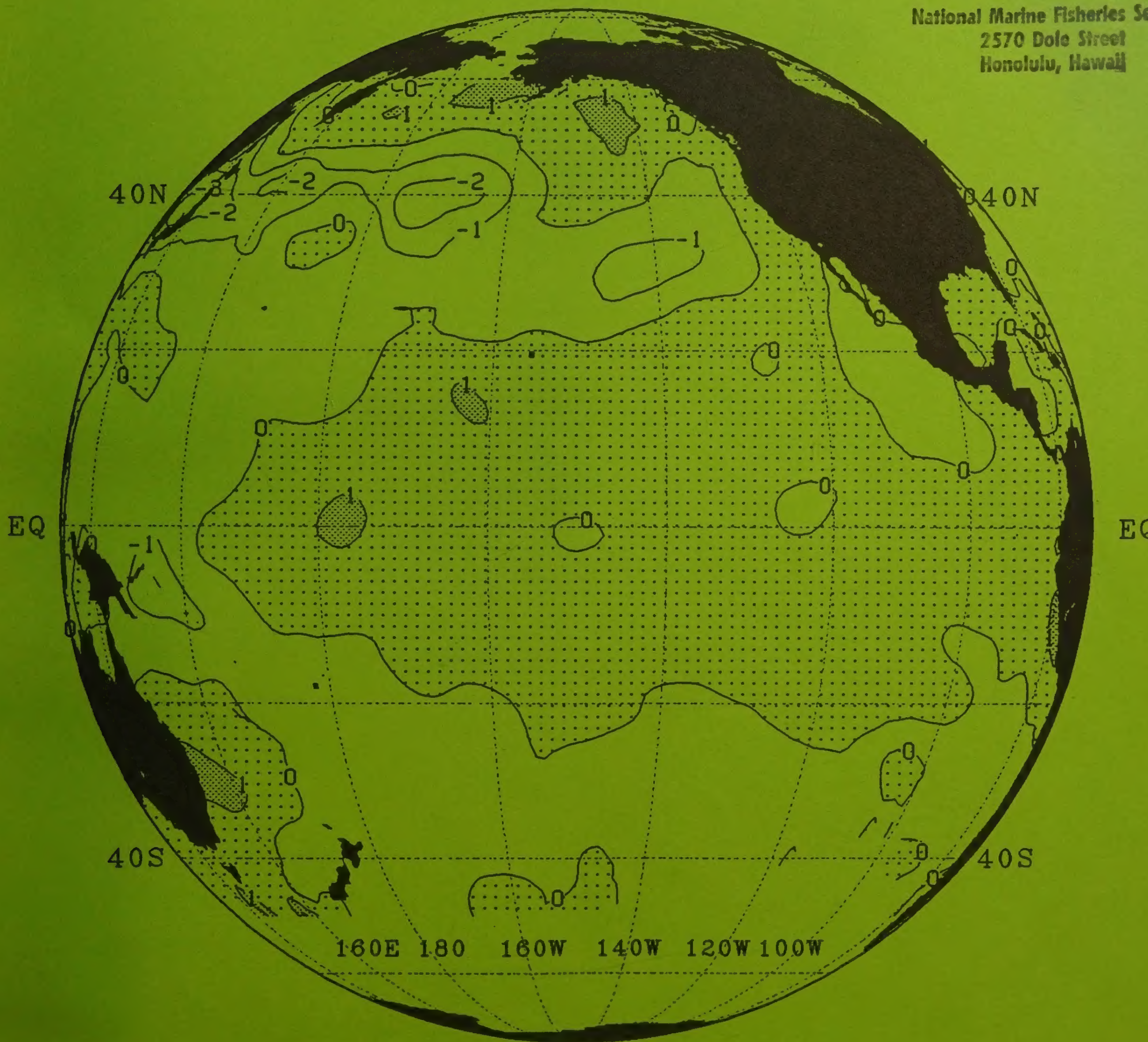
気象庁海洋月報

Monthly Ocean Report

August 1993 (No.8)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成5年8月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで
作成されています。本月報に関する問い合わせは、
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Monthly Ocean Report is prepared by the El Niño Monitoring Center (ENMOC), Oceanographical Division, Marine Department, Japan Meteorological Agency.

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表紙は1993年8月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for August 1993 in the Pacific Ocean. Areas of positive anomalies are shaded.

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海況の特徴（1993年8月）

太平洋の海況

太平洋熱帯域の海面水温は、170°E以東では平年より 0.5℃以上高い状態が続き、平年より1℃以上高い海域がペルー沿岸と日付変更線付近に見られた。エルニーニョ監視海域(4°S～4°N , 150°W～90°W）の海面水温偏差は+0.3℃で、7月より小さくなった（第1表、第1図、第6図）。

赤道域の20℃の深度は西部では変化がないが、中・東部ではやや浅くなった(第9図）。

北太平洋の海面水温は、30～45°Nの日本近海から北米沖まで帯状に平年より低く、平年より2℃以上低い海域が40°Nを中心に7月より広がった。アラスカ湾では平年より1℃以上高い状態が続き、メキシコ西岸沖では0.5℃低かった(第1図）。

日本近海の海況

日本近海の海面水温は、全般に平年より1℃以上低く、特に日本海と、北海道南部から三陸沖にかけて3℃以上低かった。一方、フィリピン近海の海面水温は29℃前後で平年より0.5℃高かった（第17図）。本州東方海域及び日本海は記録的な低水温となった。詳細については ⅲページを参照。

黒潮は、九州・四国に沿って流れた後、紀伊半島沖から33°N線に沿って東に流れ、140°E付近では北東に進み、房総半島から離岸して東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100mで5℃以下）は、38.6°N·144.0°Eまで南下していた（第19図）。

熱帯の気象

熱帯収束帯は西部から中部熱帯太平洋にかけて平年より南に偏った。日付変更線付近の対流活動は先月より弱まり、上層雲量指数（HCLD-DL）は＋0.3と昨年11月以降最も小さな値となった。太平洋赤道域の下層の東風は今月は再び西風偏差となった。SOIは－1.5と負の値が続いている（第1表、第12図、第13図）。［気象庁長期予報課提供]

HIGHLIGHTS August 1993

Pacific

Sea surface temperatures (SSTs) in the tropical Pacific continued to be more than 0.5°C above normal east of 170°E, however SSTs more than 1°C above normal were found only at the coast of Peru and along the equator near the date line. The SST index for region B (refer to Fig.6) was +0.3°C which was smaller than the last month (Table 1 and Figs.1, 6).

The depth of the 20°C isotherm along the equator (refer to Fig.9) did not change in the western Pacific, though it was shallower than July in the central and eastern Pacific.

In the North Pacific Ocean, negative SST anomalies prevailed between 30°N and 45°N from around Japan to off North America. The area with SSTs 2°C below normal has extended eastward along 40°N since last month. SSTs in the Gulf of Alaska continued to be 1°C above normal, whereas SSTs off west of Mexico were 0.5°C below normal(Fig.1).

Seas adjacent to Japan

SSTs in seas adjacent to Japan were more than 1°C below normal. SSTs were more than 3°C below normal in the Japan sea, and from south of Hokkaido to off Sanriku in particular. SSTs in seas adjacent to the Philippines were around 29°C, more than 0.5°C above normal (Fig.17).

The Kuroshio flowed along the coasts of Kyushu and Shikoku, and flowed eastward along 33°N. It flowed northeastward along 140°E and passed off the Boso Peninsula (Fig.20).

The Oyashio cold water (colder than 5°C at a depth of 100m) extended southward to 38.6°N, 144.0°E (Fig.19).

Atmospheric conditions in the tropics

The ITCZ was shifted southward over the western and central Pacific. Convective activities near the date line weakened but remained slightly stronger than normal. Low level easterlies over the equatorial Pacific returned to westerly anomalies. The SOI remained negative (-1.5).

[prepared by the Long-range Forecast Division, JMA]

本州東方海域（34～42°N, 140～150°E）の海面水温は本年４月から、日本海（36～44°N, 130～140°E）は６月から平年より低い状態が続いていたが、８月になっても水温上昇は鈍く、月平均はそれぞれ平年より 2.2℃及び 3.2℃低かった。これらの値は月平均値が通年で得られている1949年以降で負の最大偏差であり、８月の海域平均の最低値を１℃以上更新した。また７月の本州東方海域の月平均海面水温も過去最低を記録した（表 A）。

SSTs have been lower than normal since this spring in seas adjacent to Japan. In August, the monthly regional mean anomalies were -2.2℃ at east of Honshu and -3.2℃ in the Japan Sea, respectively. Both of them are the lowest anomalies since 1949 for all months, and the lowest temperature records of August were broken by more than 1℃ in both regions. The regional mean at east of Honshu in July was also the lowest. (Table A)

表　A　本州東方海域及び日本海の低い海面水温の順位

Table A　Ranking of low monthly SST means in seas adjacent to Japan.
The normal is the mean of 1961 to 1990.

region	July			August		
	rank	year	temp.	rank	year	temp.
East of Honshu	1	1993	19.2	1	1993	21.7
	2	1983	19.6	2	1980	22.8
34°N- 42°N	2	1965	19.6	2	1976	22.8
140°E-150°E	4	1986	19.7	4	1992	23.0
	5	1992	19.8	4	1991	23.0
	normal		21.0 ℃	normal		23.9 ℃
	rank	year	temp.	rank	year	temp.
The Japan Sea	1	1986	18.3	1	1993	20.2
	2	1963	18.8	2	1980	21.6
36°N- 44°N	3	1956	18.9	3	1987	21.9
130°E-140°E	4	1965	19.1	3	1971	21.9
	5	1974	19.2	5	1991	22.2
	5	1949	19.2			
	normal		20.2 ℃	normal		23.4 ℃

Date		1992										1993							
		MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Pacific Sea Surface Temperature (℃)																			
D	(14N~ Eq.)	27.9	28.7	29.1	29.4	29.1	29.1	29.2	29.5	29.0	28.7	28.0	28.0	28.2	28.6	28.8	29.2	29.1	28.9
	(130E~150E)	-0.5	-0.1	0.0	+0.1	-0.1	0.0	0.0	+0.2	-0.2	-0.2	-0.5	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2
A	(4N~ 4S)	28.9	29.2	29.4	29.2	29.2	29.1	28.8	28.8	28.7	28.8	28.5	28.4	28.4	28.7	29.0	29.1	29.1	28.8
	(160E~150W)	+0.8	+1.0	+0.9	+0.7	+0.7	+0.7	+0.5	+0.4	+0.3	+0.6	+0.5	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4
B	(4N~ 4S)	28.0	28.5	28.3	26.9	25.6	24.6	24.5	24.6	24.7	25.0	25.5	26.6	27.4	28.1	28.0	27.0	25.8	24.9
	(150W~ 90W)	+1.1	+1.4	+1.7	+0.8	+0.4	0.0	-0.1	0.0	+0.1	+0.1	+0.1	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3
C	(Eq.~ 10S)	27.5	28.0	26.4	23.7	21.6	20.5	20.2	20.8	21.2	22.5	24.3	26.1	27.0	26.4	25.2	23.3	22.1	21.0
	(90W~ 80W)	+1.6	+2.9	+2.5	+1.0	0.0	-0.1	-0.1	+0.1	-0.3	-0.1	0.0	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4
Pacific Sea Level Anomaly (cm)																			
YAP	(10N,138E)	2	1	6	5	-2	-3	2	9	6	8	7	9	11	1	-2	-2	1	
RABAUL	(4S,152E)	-18	-18	-20	-18	-13	-11	-10	-6	-6	-6	-9	-10	-14	-12	-13	-11	-8	
MAJURO	(7N,171E)	-7	0	-2	4	7	7	11	15	6	4	-1	-4	-4	-8	-1	6	5	
TARAWA	(1N,173E)	-4	-7	-2	-2	2	3	5	2	2	4	1	7	10	3	5	6	4	
CHRISTMAS	(2N,157W)	15	7	5	-3	-2	-7	-4	-3	4	1	5	4	8	6	5	-1	-2	
SANTA CRUZ	(1S, 90W)	18	8	4	-4	-1	-1	-3	-1	-1	-2	4	8	7	7	10	4	0	

第１表 (a) エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Dept. of Oceanography, University of Hawaii for the sea level anomaly.

Date	1992										1993							
	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Southern Oscillation Index (Unit of pressure anomalies at Tahiti and Darwin : hPa)																		
SOI (TAHITI-DARWIN)	-2.0	-1.6	-0.1	-1.3	-0.5	0.1	-0.0	-2.0	-0.6	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5
TAHITI (17.5S , 150W)	-1.5	-0.8	0.0	-1.6	0.7	0.1	-0.8	-2.3	-0.5	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0
DARWIN (12.5S , 131E)	2.8	1.4	0.1	-0.1	1.6	-0.1	-0.8	0.5	0.6	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2
High Cloud Amount Index																		
HCLD-PH (20N ~ 10N) (110E ~ 140E)	-1.1	-1.0	-1.5	-1.1	-0.3	0.2	-1.6	0.9	-1.7	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4
HCLD-MC (5N ~ 5S) (110E ~ 135E)	-1.4	-1.0	-1.0	-0.7	-0.5	-1.2	-0.4	0.6	-0.8	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4
HCLD-DL (5N ~ 5S) (170E ~ 170W)	1.8	2.3	2.0	1.7	0.0	0.1	-0.6	-0.1	1.3	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3
Equatorial Zonal Wind Index																		
U200-IN (5N ~ 5S) (80E ~ 100E)	0.5	0.1	0.6	0.2	-0.4	-0.4	-1.1	-1.4	0.1	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5
U200-CP (5N ~ 5S) (180 ~ 125W)	-0.8	-0.9	-1.1	-0.1	0.0	1.1	-0.4	0.7	-0.2	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3
U850-WP (5N ~ 5S) (160E ~ 175W)	1.0	0.9	0.6	0.1	0.1	-0.4	0.2	0.2	0.4	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7
U850-CP (5N ~ 5S) (170W ~ 135W)	1.1	0.8	0.9	0.1	0.3	-0.7	0.5	-0.4	0.9	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1
U850-EP (5N ~ 5S) (130W ~ 100W)	0.3	0.2	0.5	0.4	-0.1	-0.9	0.6	-1.2	1.9	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8

第１表 (b) エルニーニョ監視指数(続き)

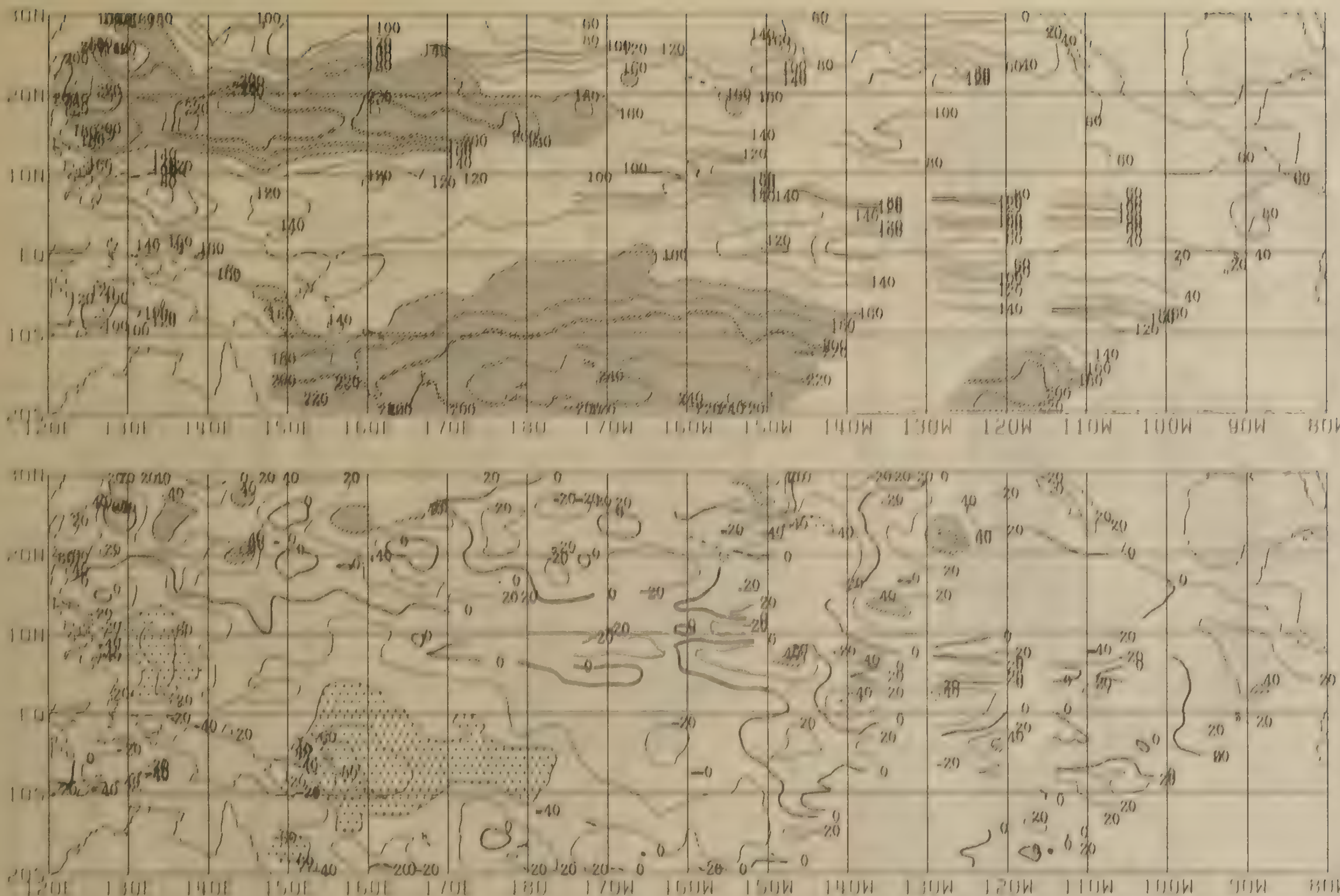
Table 1(b) El Niño monitoring indices (continued) .

Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.



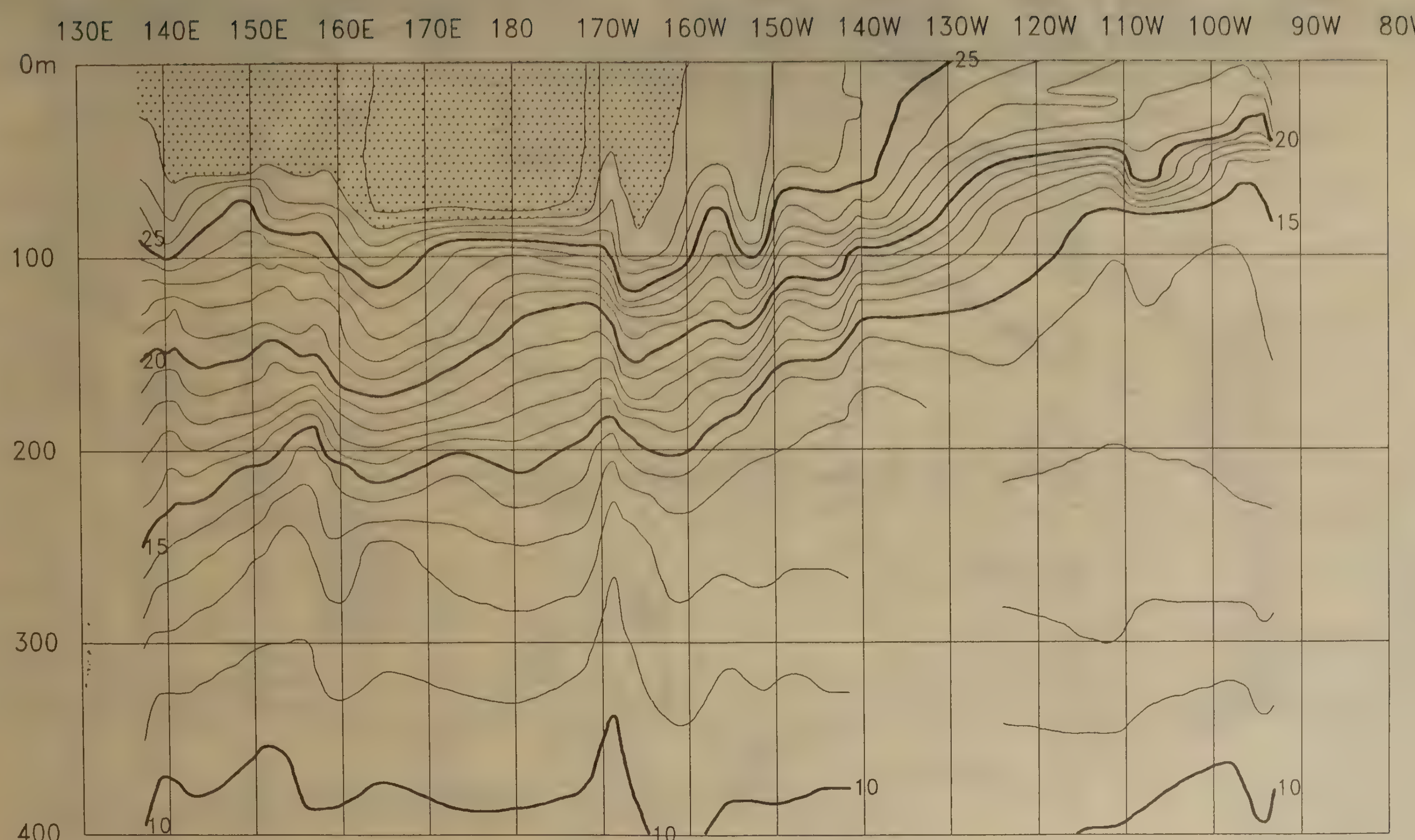
第１図　全球月平均海面水温図（上）及び偏差図（下）（1993年 8月）

Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for AUG 1993. Anomalies are computed with respect to the JMA climatology (1961–90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines. Negative anomalies are stippled.



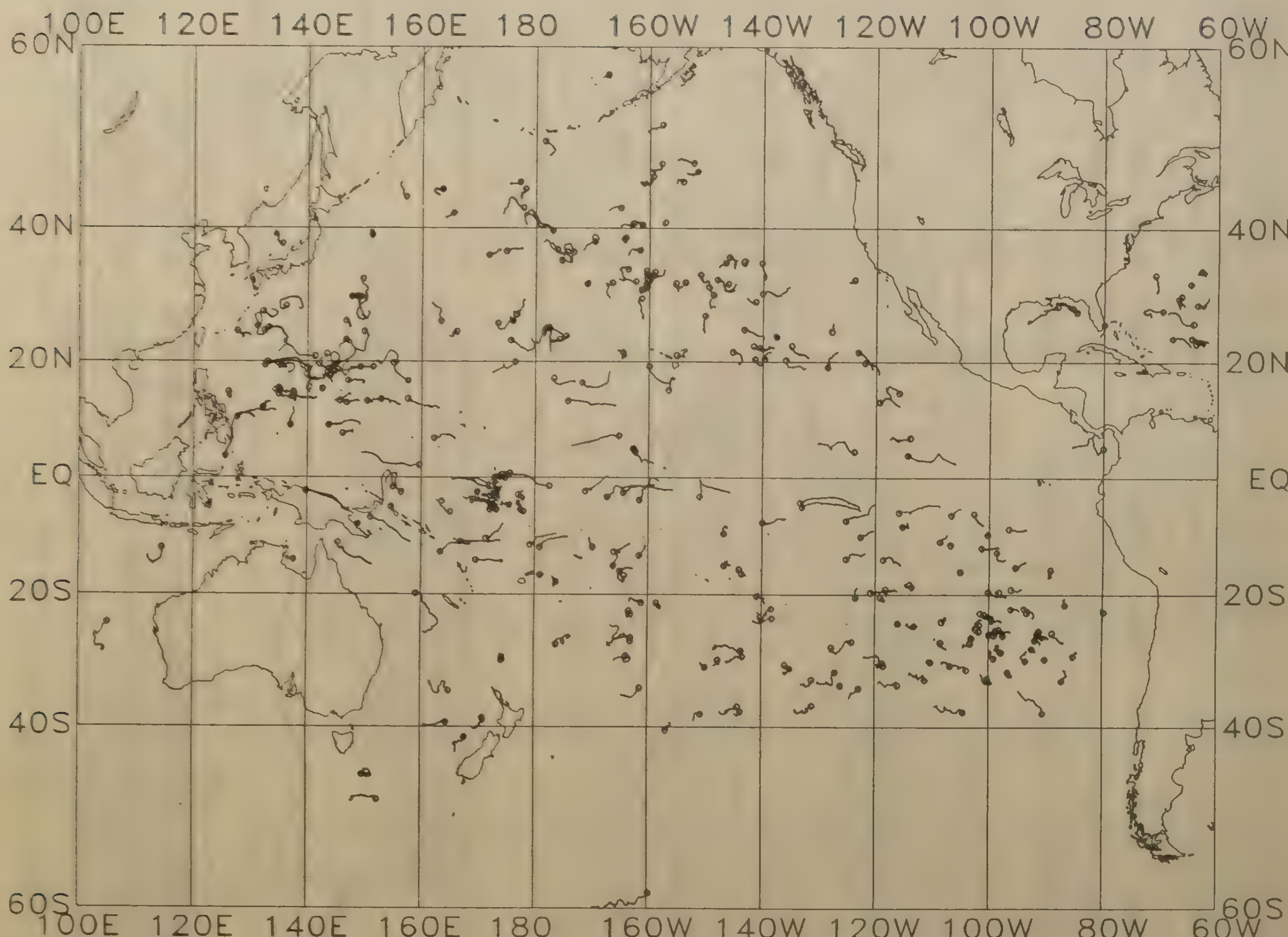
第2図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1993年 8月）

Fig.2　The depth of a 20°C isotherm in the Pacific Ocean (top) and anomalies (bottom) for AUG 1993.　Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA)
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



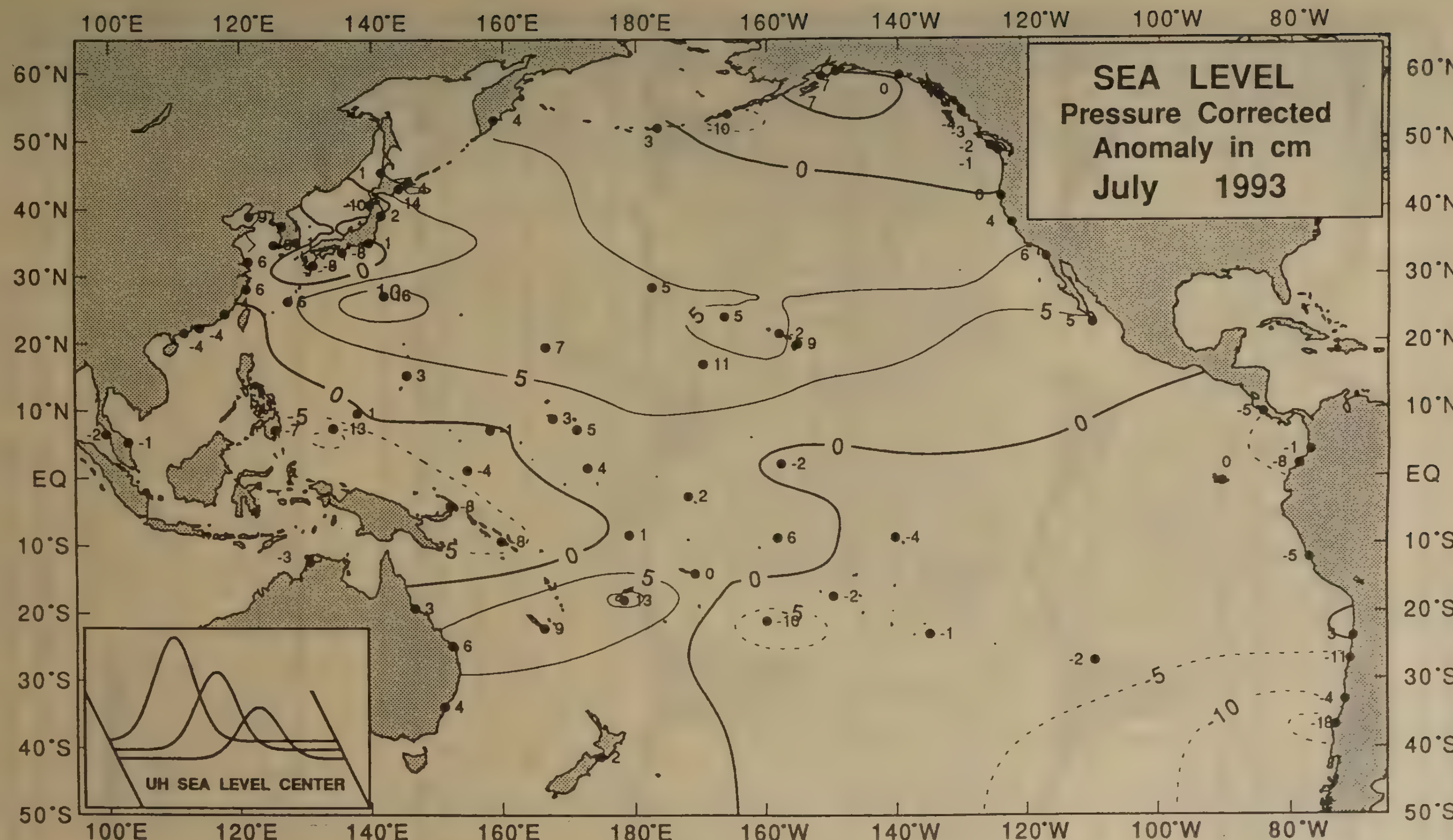
第３図　太平洋赤道に沿う表層水温断面図（1993年 8月）

Fig.3 Depth-longitude section of the Pacific Ocean temperature along the equator for AUG 1993. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1993年 8月)

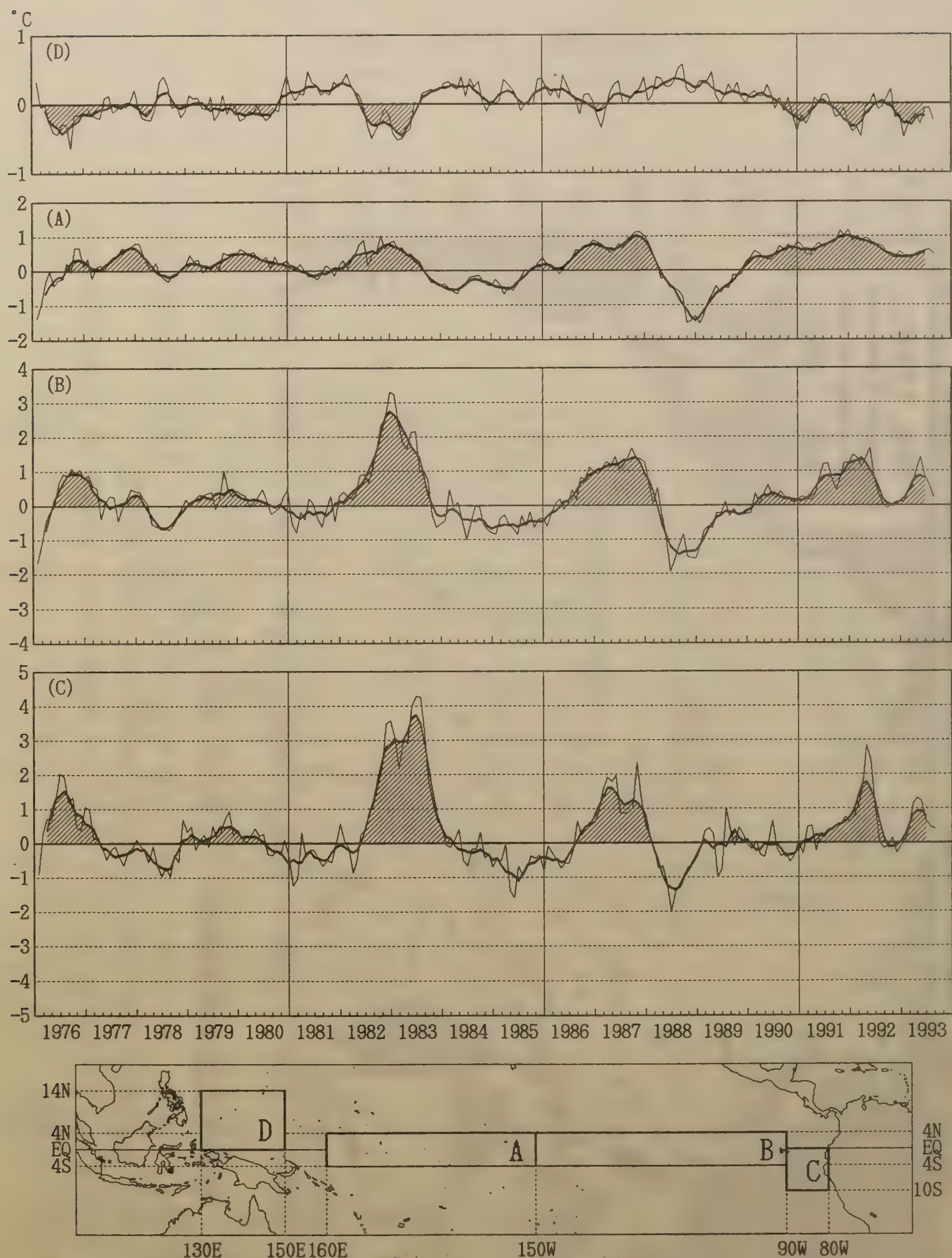
Fig.4 Movements of drifting buoys in the Pacific Ocean during AUG 1993. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1993年 7月 ）

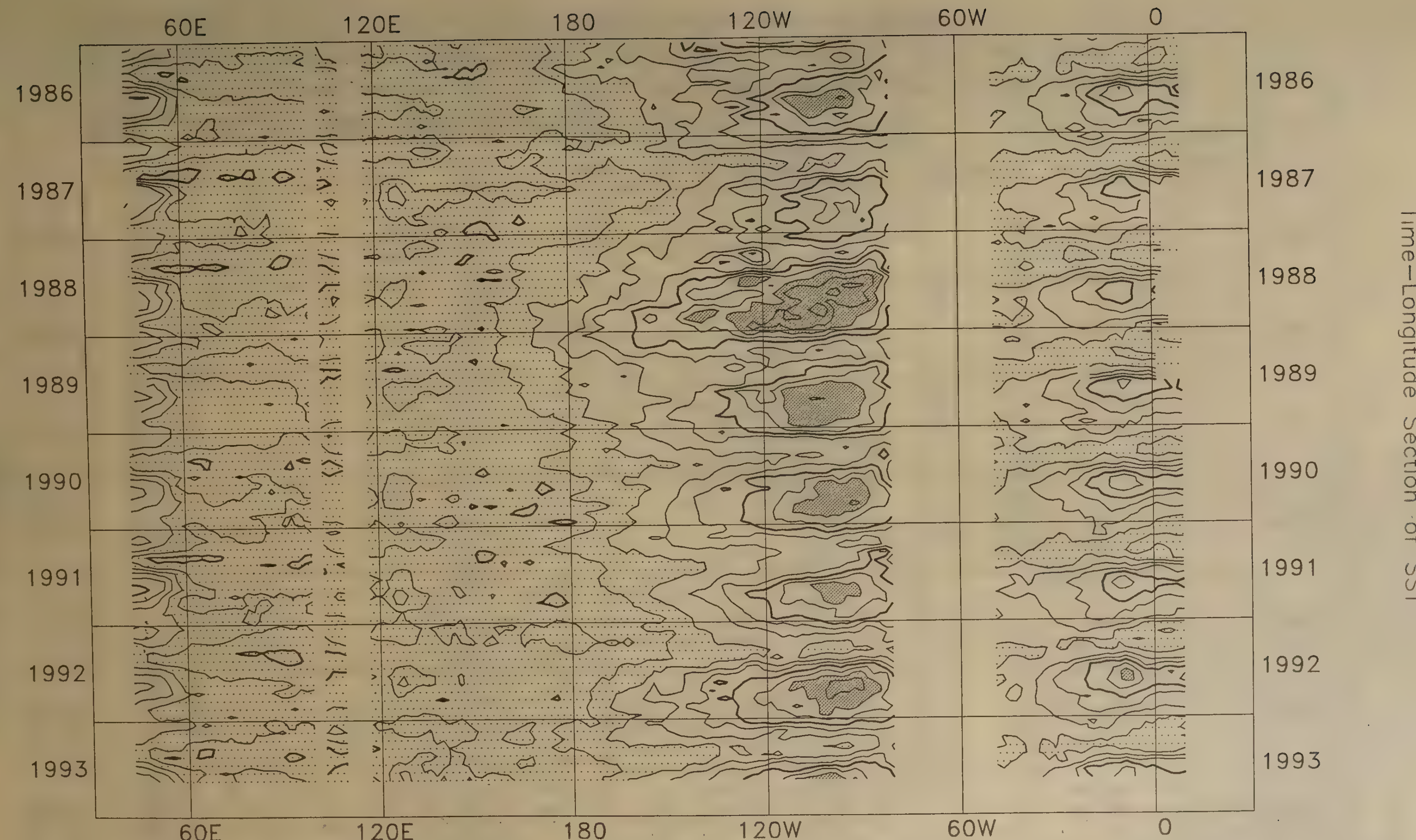
Fig.5 Sea level anomalies obtained from the 1975 to 1986 mean JUL sea level adjusted for atmospheric pressure (JUL 1993).
This figure is prepared by the SOC of ISLP-PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



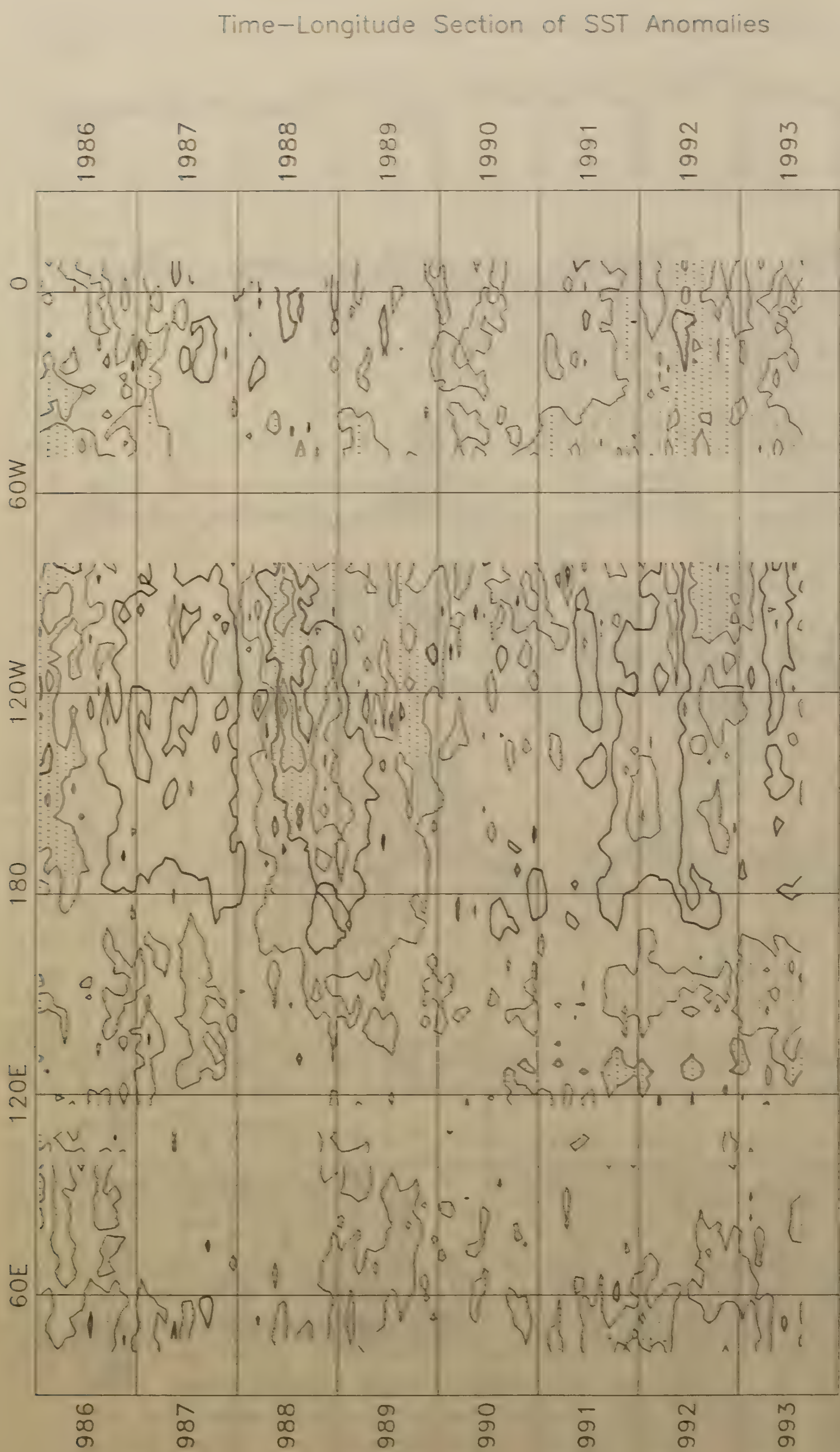
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).



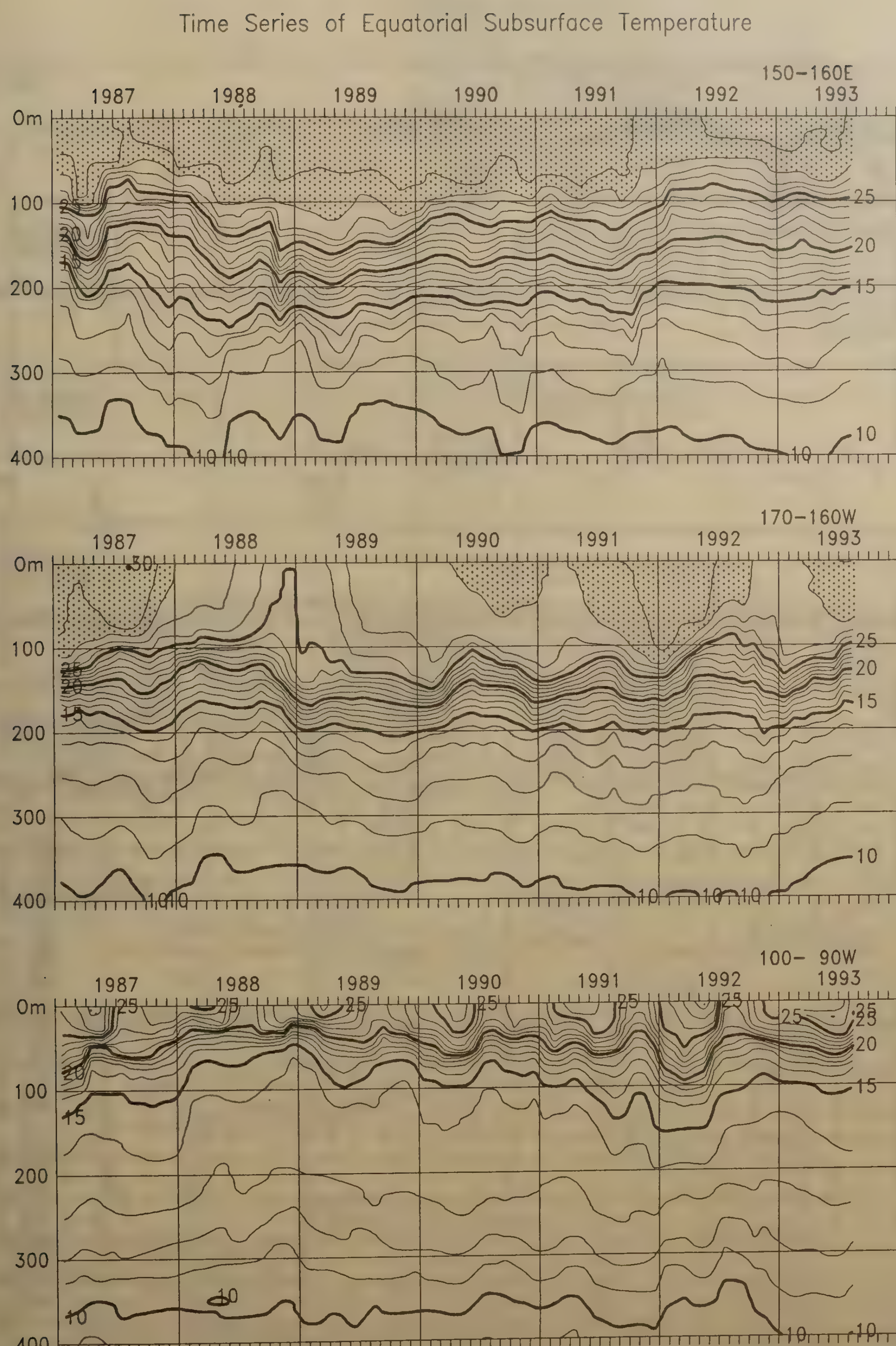
第7図　赤道に沿う海面水温時系列図

Fig.7 Time-longitude section of SSTs along the equator (2° N-2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



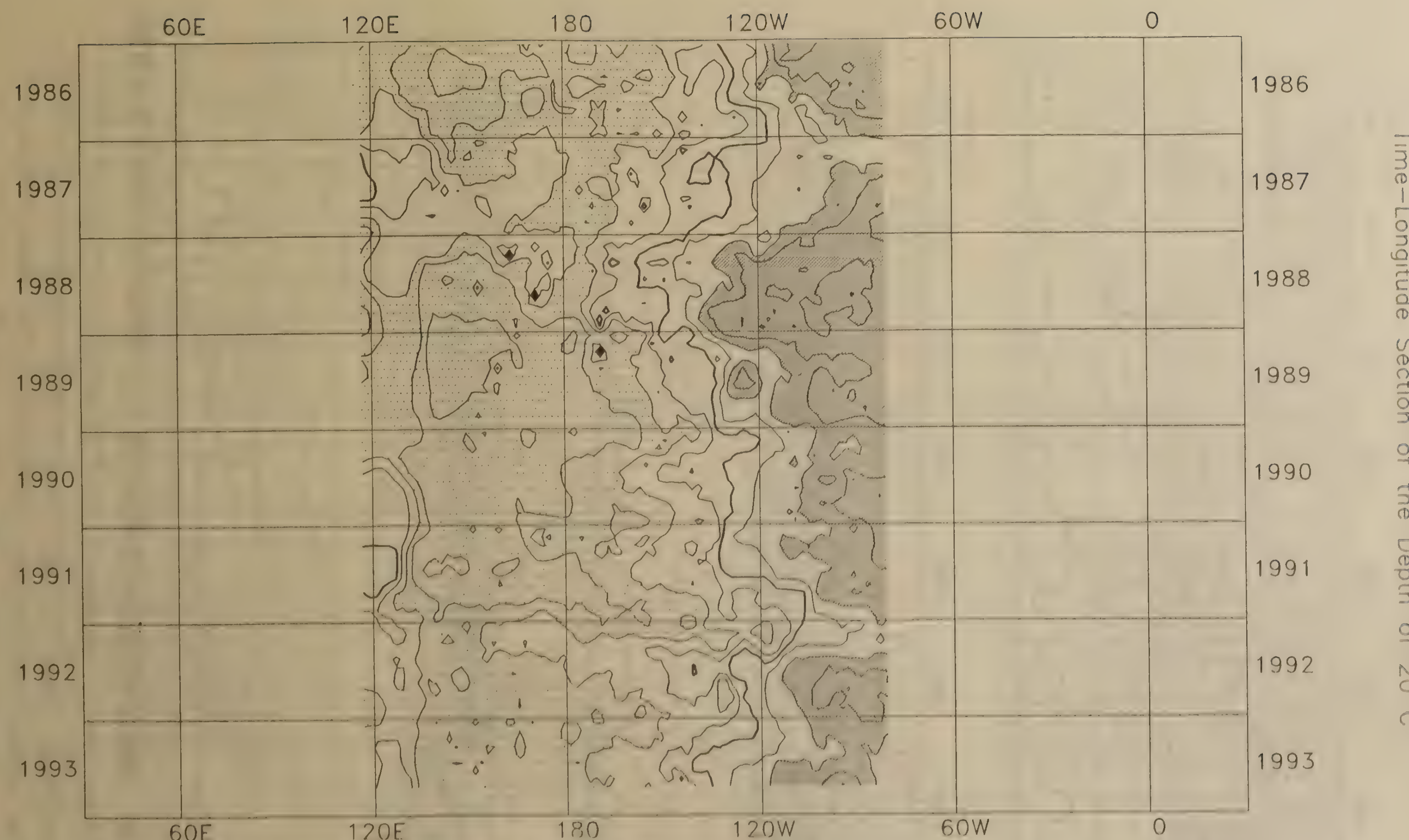
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



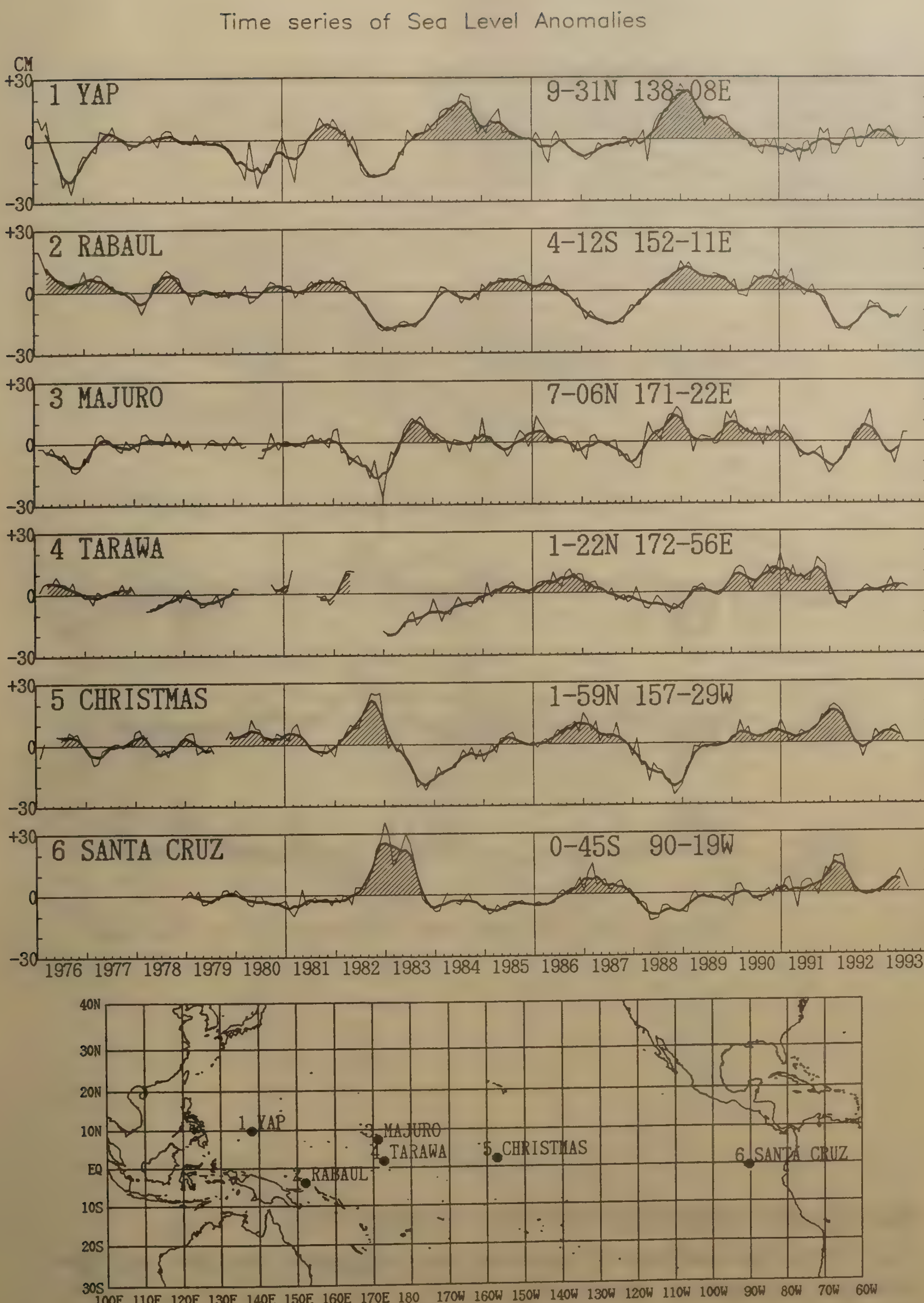
第9図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図 太平洋の赤道に沿う20℃深度時系列図

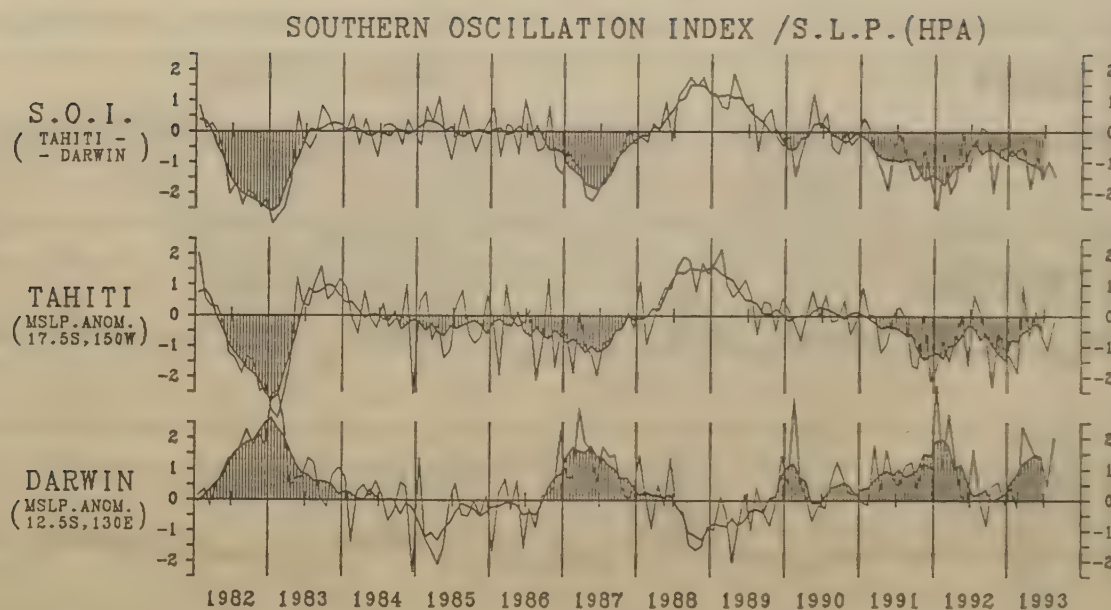
Fig.10 Time-longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

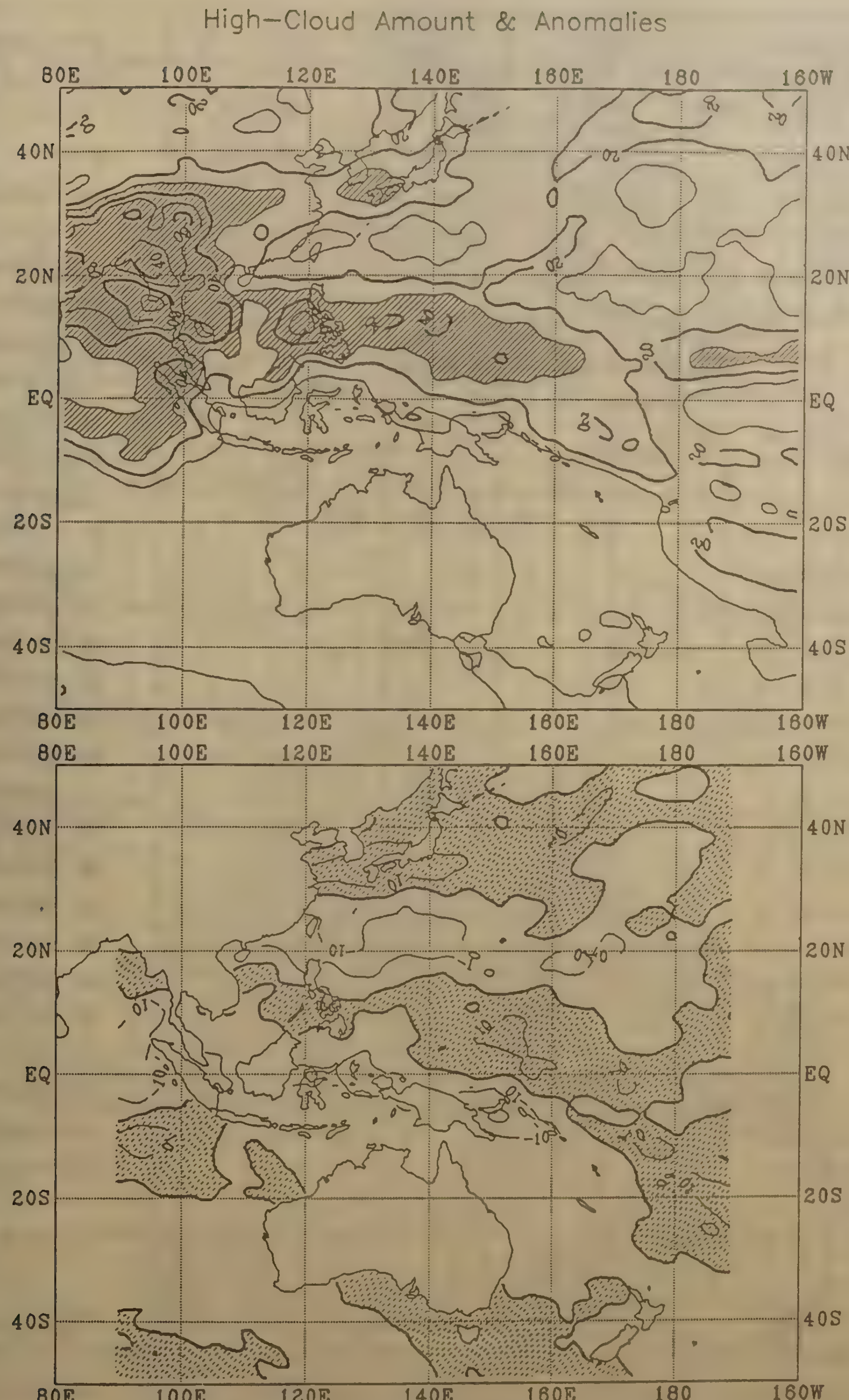
Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



第12図　南方振動指数及び海面気圧偏差時系列図

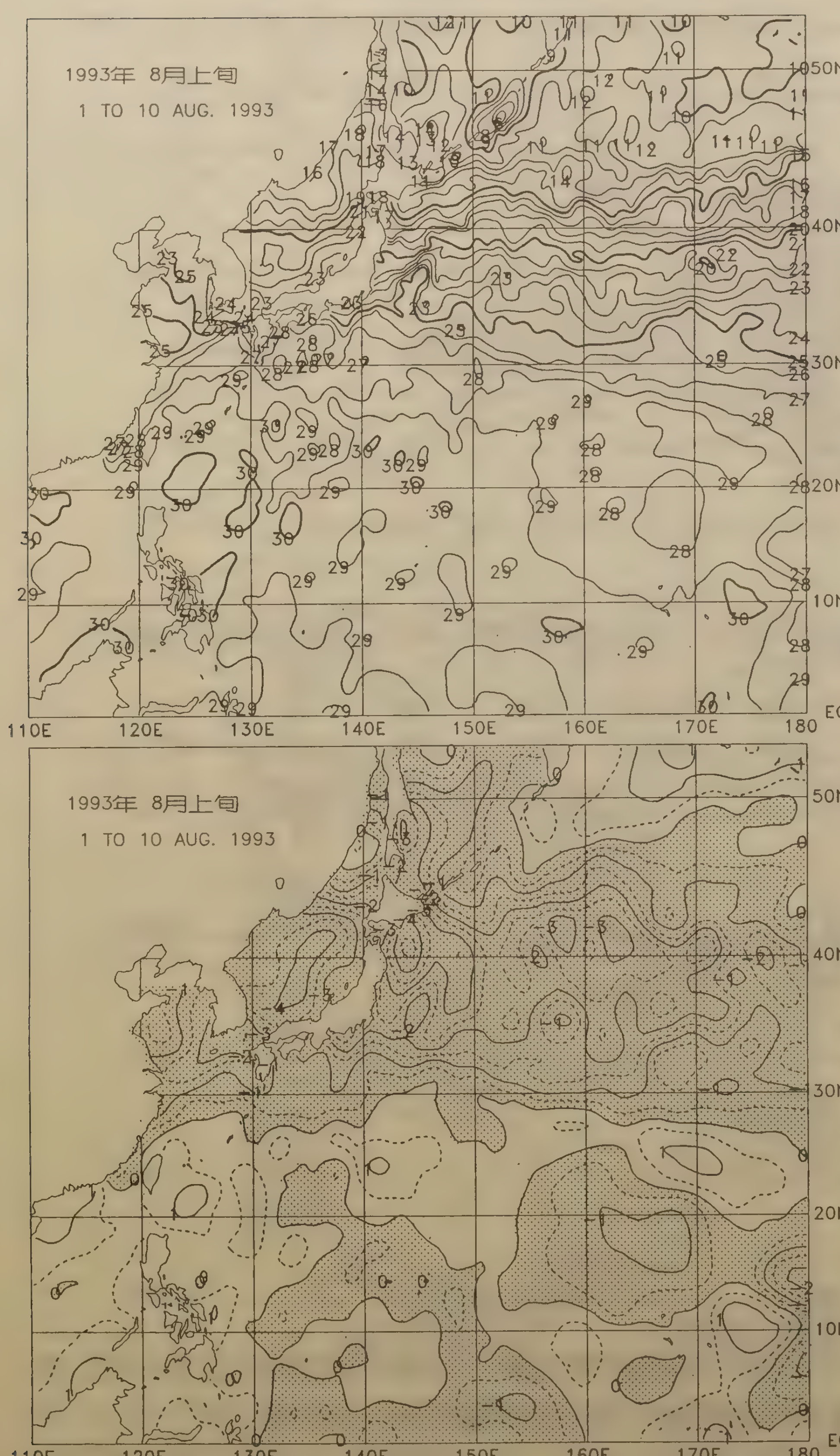
Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1993年 8月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for AUG 1993. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978–1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

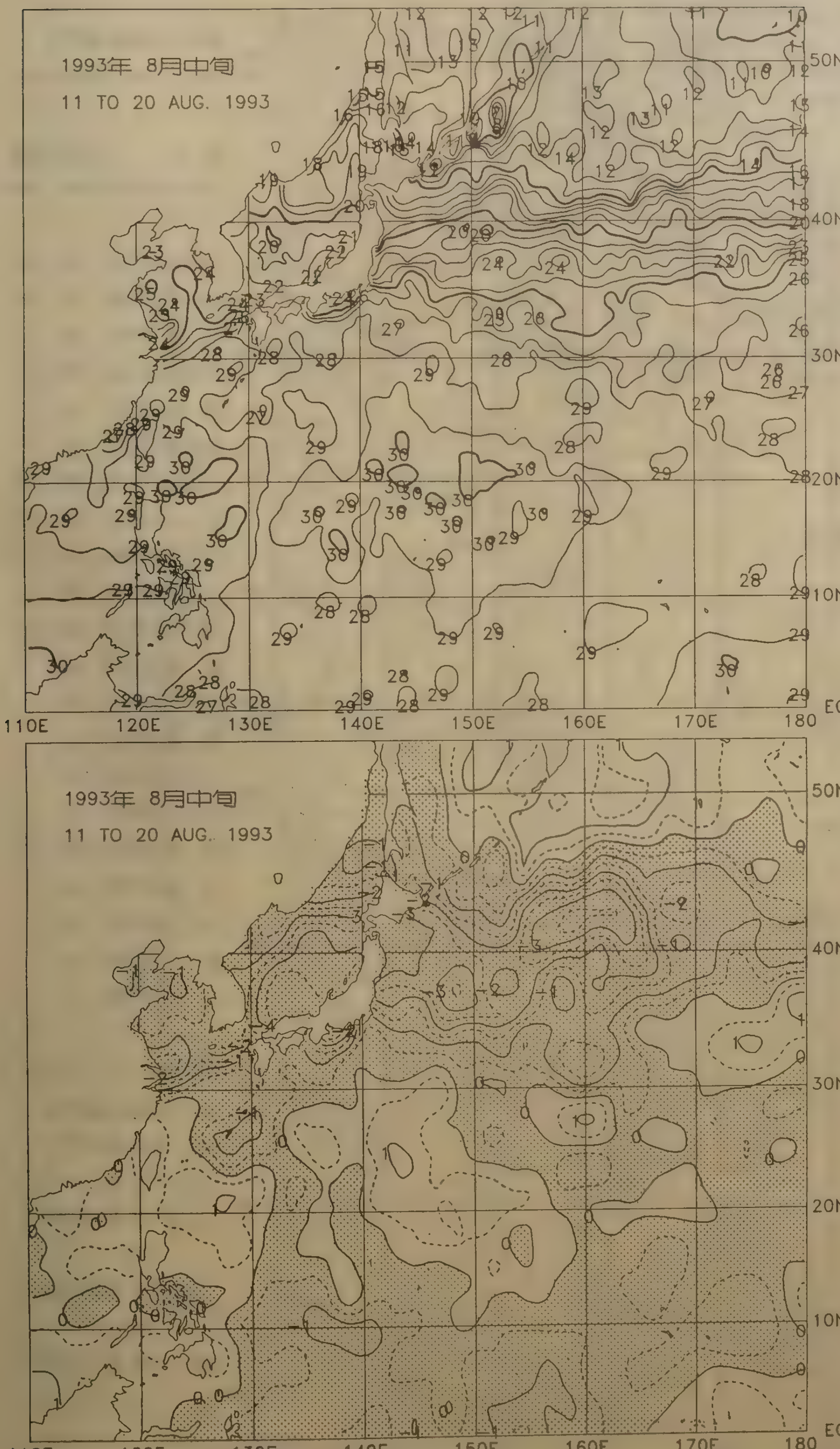
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	30.0	+0.9
那　覇(47936)	28.5	+0.2
名　瀬(47909)	28.5	–
足摺岬(47898)	25.0	−1.8
潮　岬(47778)	26.0	–
御前崎(47655)	22.5	−3.4
八丈島(47678)	25.9	−0.8
館　山(47672)	22.4	−1.4
小名浜(47598)	20.0	−0.4
宮　古(47585)	15.4	−3.2
浦　河(47426)	16.1	−2.2
紋　別(47435)	16.2	–
稚　内(47401)	–	–
寿　都(47421)	17.5	–
江　差(47428)	18.4	–
飛　島(47587)	22.8	−2.7
輪　島(47600)	24.1	−2.5
西　郷(47740)	–	–
浜　田(47755)	22.7	–
厳　原(47800)	23.1	–
牛　深(47838)	25.3	–

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

位置	位置	水温
日本海	37.9N,145.4E	19.7
四国沖	29.0N,135.0E	27.9
東シナ海	28.2N,126.3E	29.0

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年 8月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in AUG 1993. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

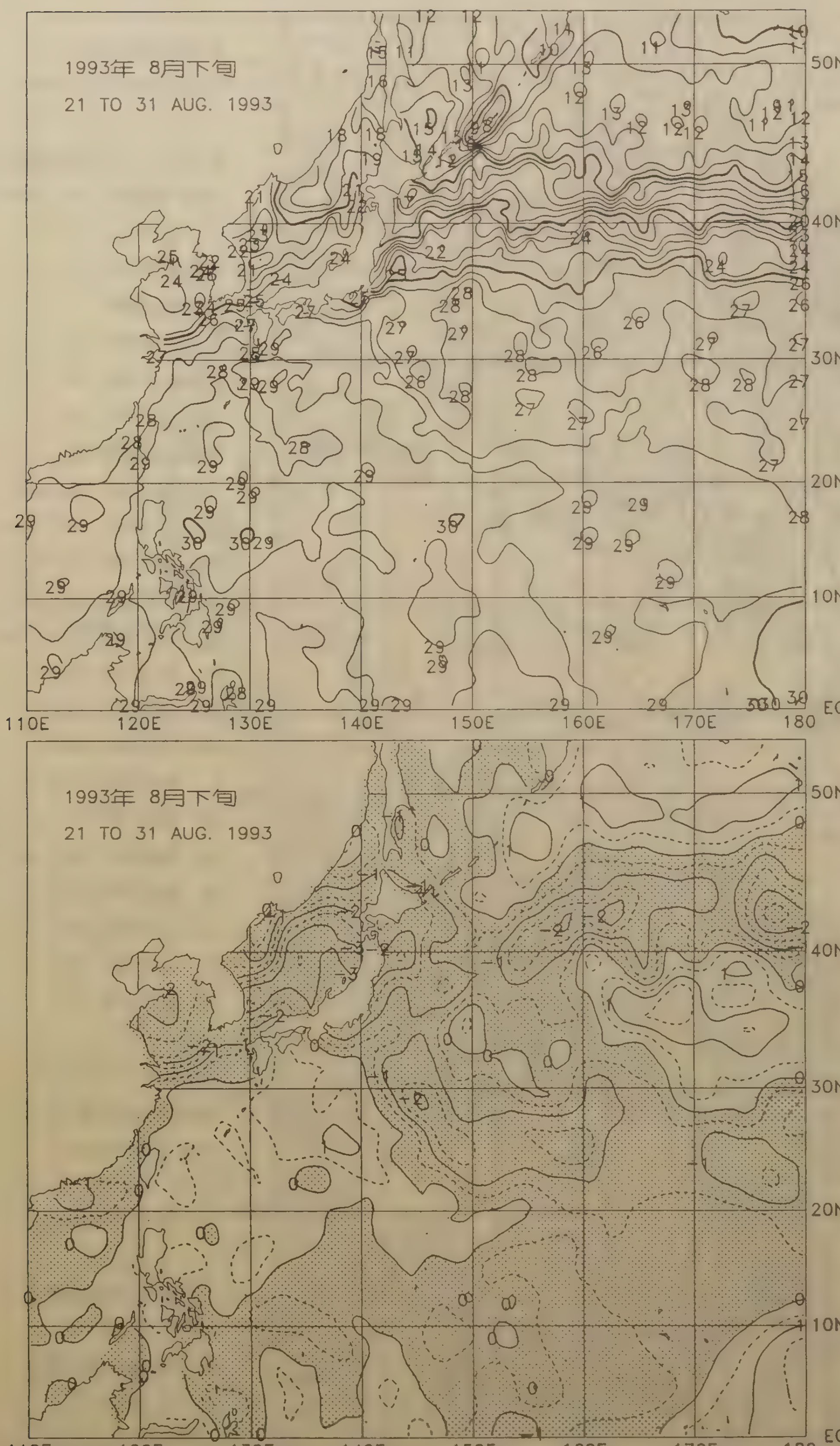
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	29.9	+1.0
那 覇(47936)	-	-
名 瀬(47909)	27.9	-
足摺岬(47898)	26.1	−1.0
潮 岬(47778)	27.1	-
御前崎(47655)	23.4	−3.1
八丈島(47678)	26.6	−0.5
館 山(47672)	23.5	−0.8
小名浜(47598)	20.1	−1.3
宮 古(47585)	16.2	−3.3
浦 河(47426)	17.1	−1.8
紋 別(47435)	18.0	-
稚 内(47401)	18.7	-
寿 都(47421)	18.4	-
江 差(47428)	19.6	-
飛 島(47587)	-	-
輪 島(47600)	23.4	−3.5
西 郷(47740)	21.0	-
浜 田(47755)	22.4	-
厳 原(47800)	23.1	-
牛 深(47838)	25.3	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,145.4E	20.0
四国沖	29.0N,135.0E	28.5
東シナ海	28.2N,126.3E	29.2

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年 8月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in AUG 1993. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

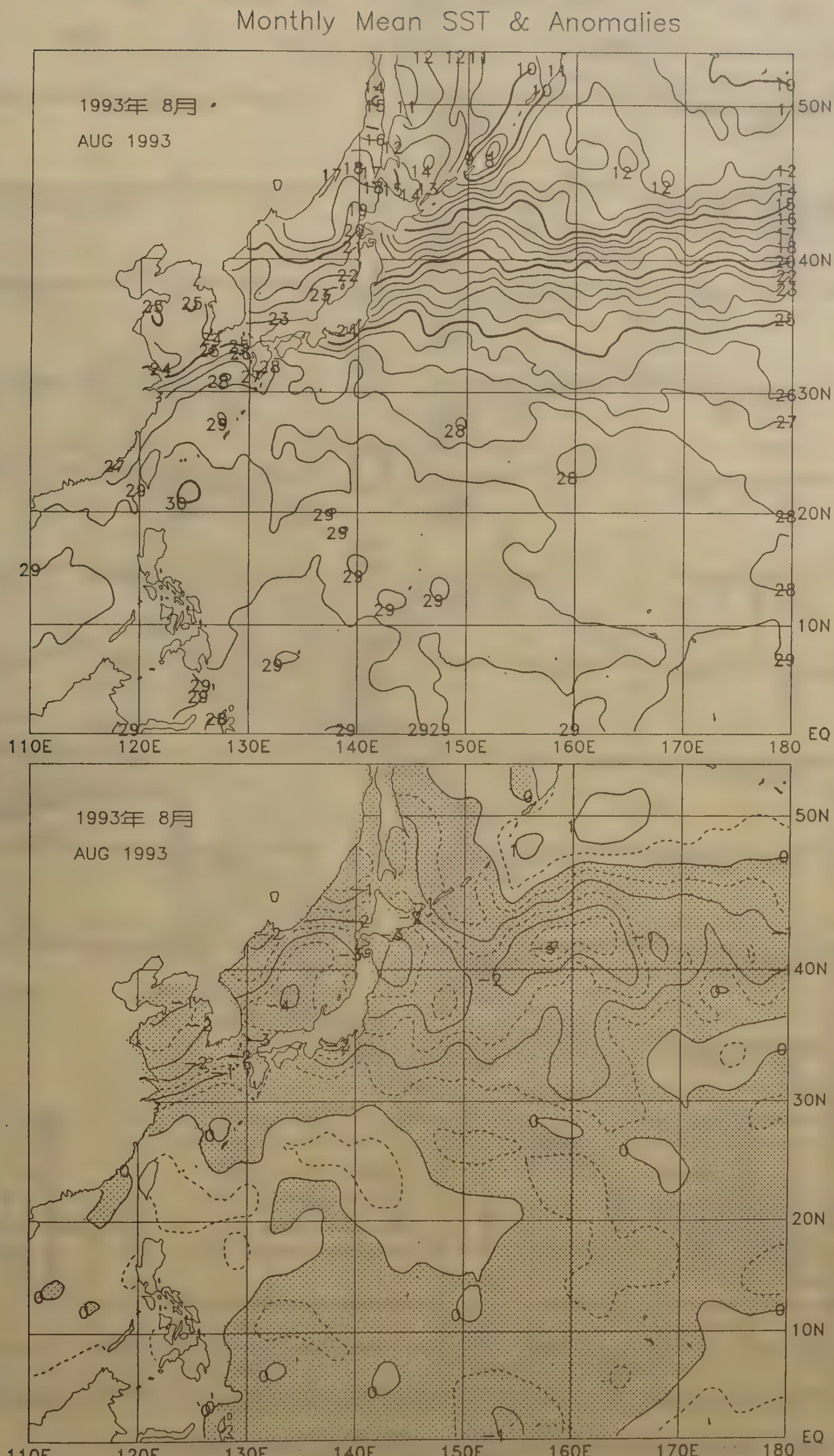
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	30.2	+1.4
那 覇(47936)	29.1	+1.4
名 瀬(47909)	28.3	-
足摺岬(47898)	27.0	-0.2
潮 岬(47778)	27.2	-
御前崎(47655)	24.3	-1.7
八丈島(47678)	27.5	+0.5
館 山(47672)	23.0	-1.2
小名浜(47598)	21.2	-1.0
宮 古(47585)	18.5	-1.4
浦 河(47426)	18.6	-0.3
紋 別(47435)	19.4	-
稚 内(47401)	19.5	-
寿 都(47421)	19.3	-
江 差(47428)	20.8	-
飛 島(47587)	23.1	-2.3
輪 島(47600)	24.4	-1.8
西 郷(47740)	22.5	-
浜 田(47755)	23.7	-
厳 原(47800)	23.8	-
牛 深(47838)	25.7	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,145.4E	21.6
四国沖	29.0N,135.0E	29.3
東シナ海	28.2N,126.3E	29.3

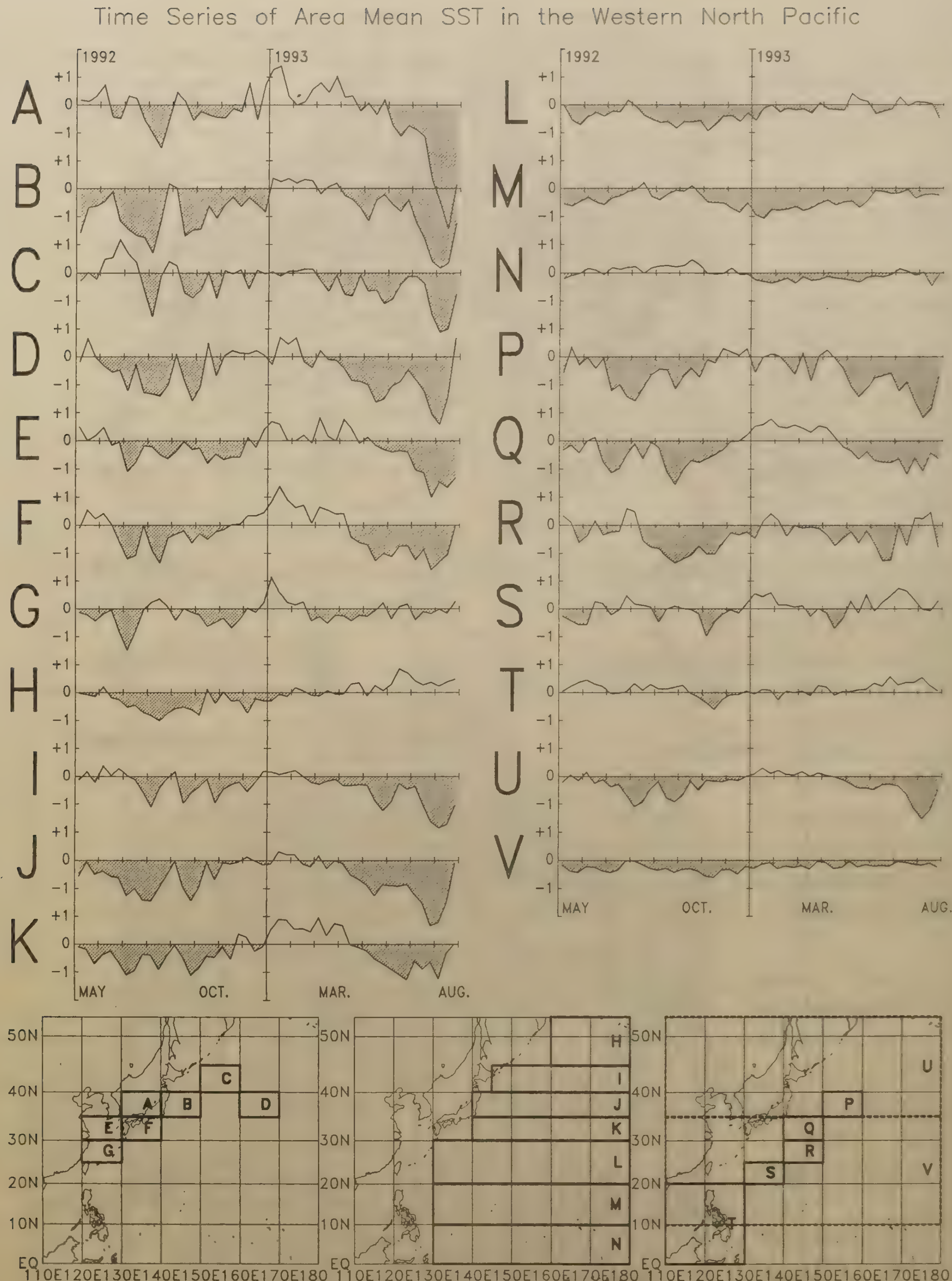
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年 8月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in AUG 1993. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



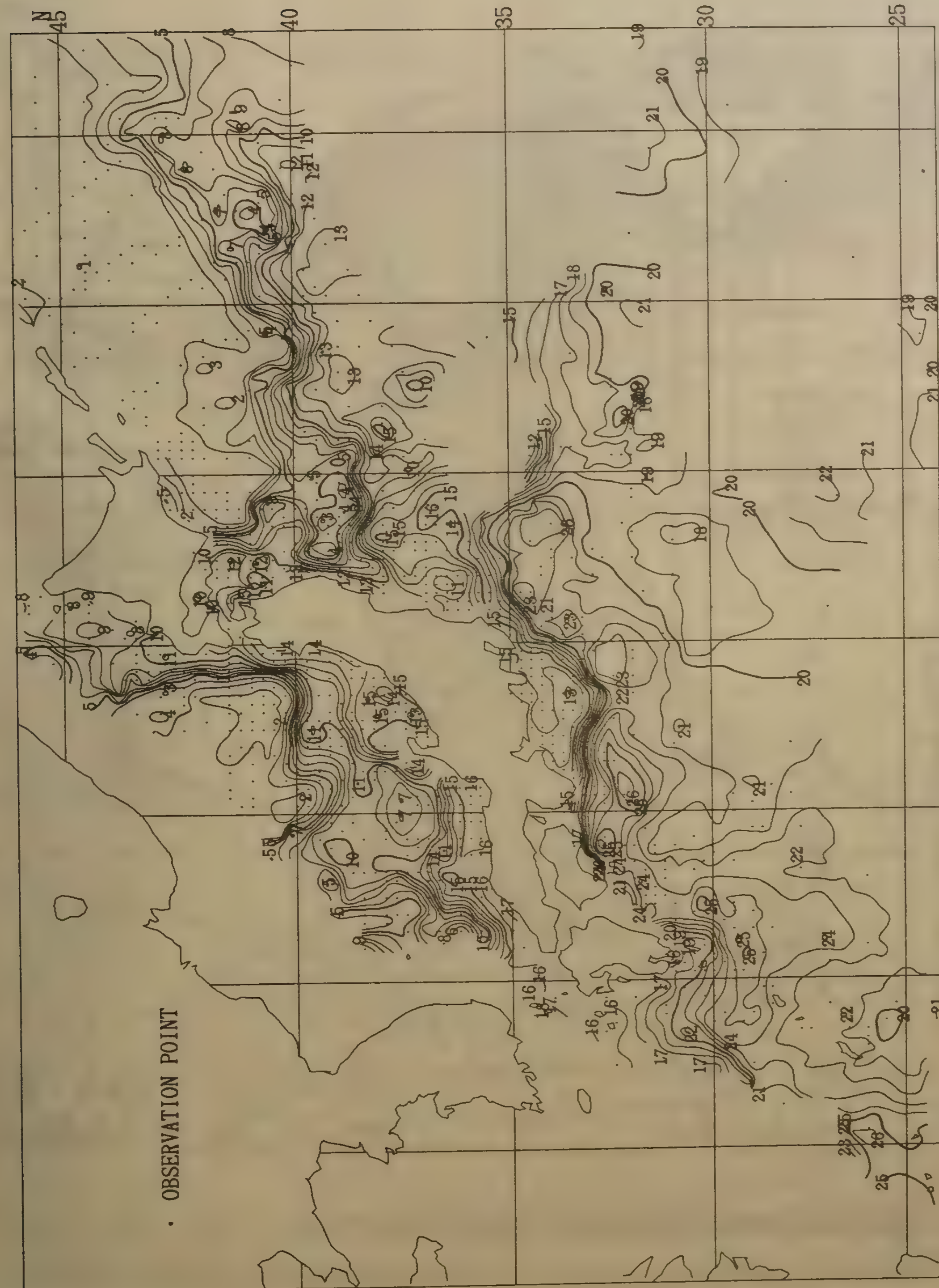
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1993年 8月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for AUG 1993. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



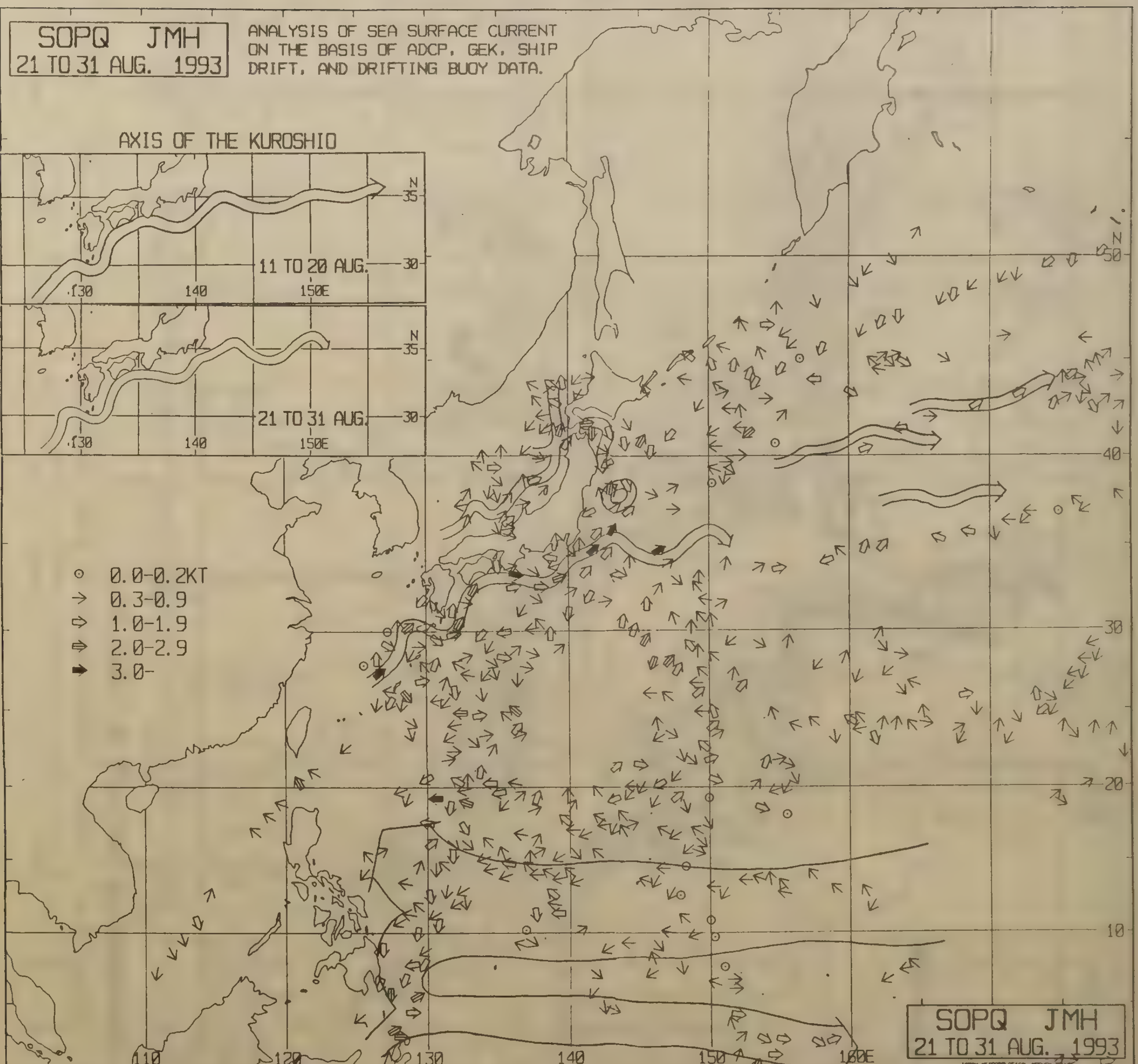
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (° C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



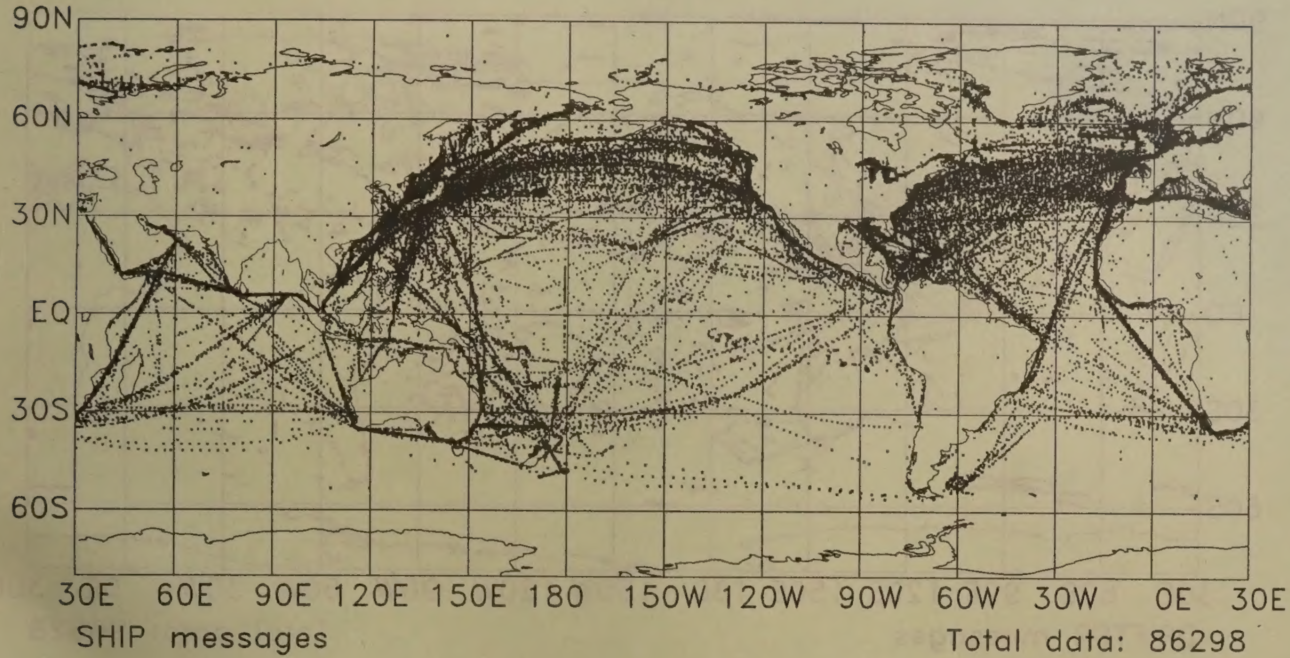
第19図　日本近海表層水温（深さ100M）図（1993年 8月）

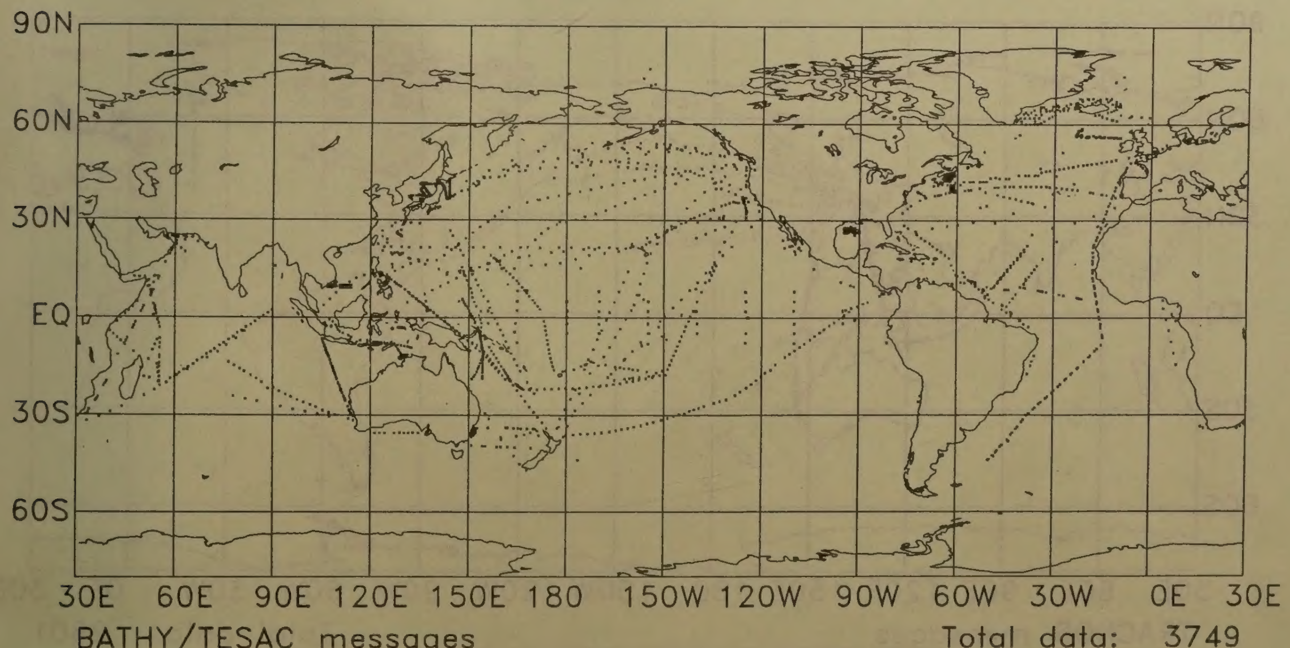
Fig.19　Subsurface (100m) temperatures in seas adjacent to Japan for AUG 1993.



第20図　北西太平洋旬平均海流図（1993年 8月下旬）

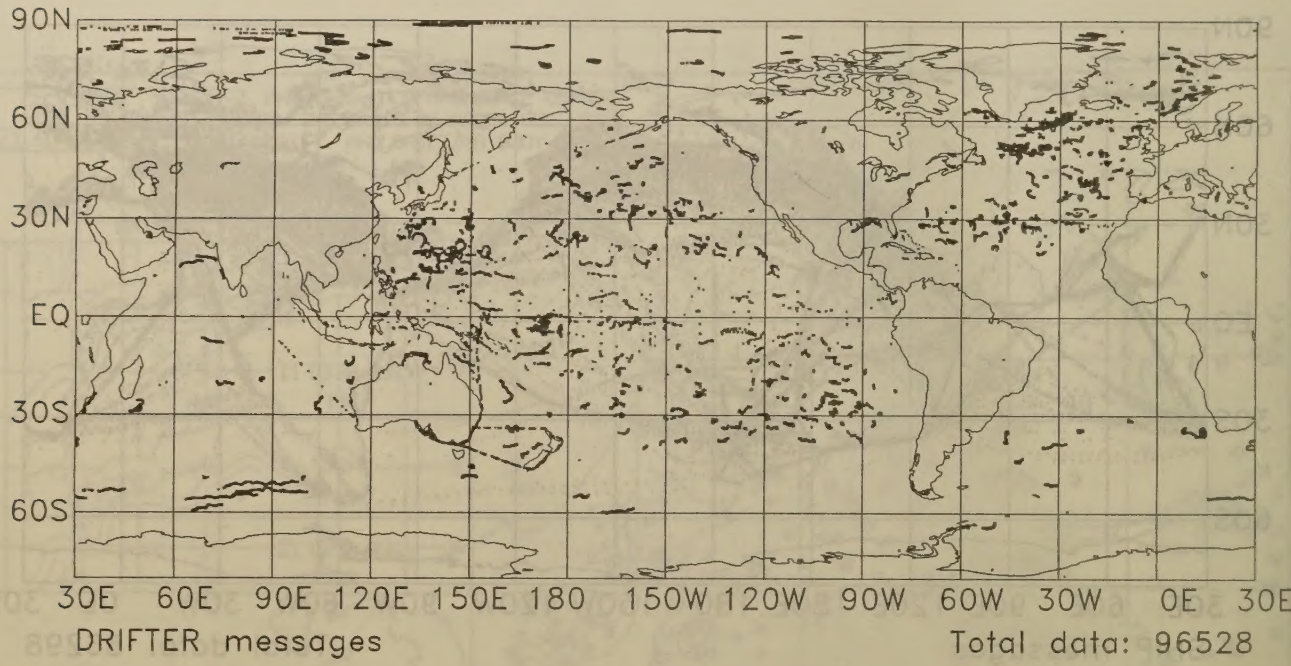
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in AUG 1993. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

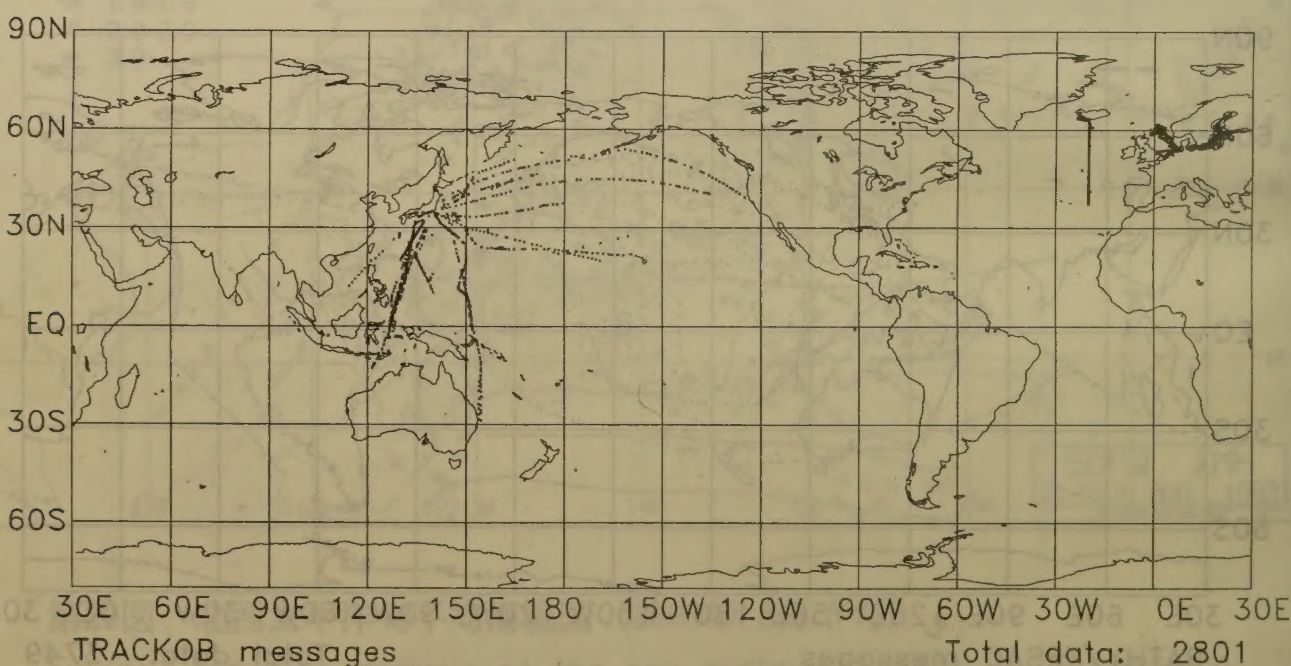




第21-1図　測点分布図(1993年 8月)

Fig.21−1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for AUG 1993.





第21-2図　測点分布図(1993年 8月)

Fig.21-2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for AUG 1993.

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